CLAIMS

What is claimed is:

1. A sensor for detecting radiant energy, comprising:

a support chip having an outer rim and a thermopile supported by the rim; and

a mating chip having a rim region and a window region, the rim region of the mating chip being mated to the rim of the support chip to form a hermetic seal.

2. The sensor of claim 1, wherein the support chip and the mated chip define an inner cavity in which the thermopile resides.

3. The sensor of claim 1, wherein the thermopile includes a plurality of thermocouples connected in series.

4. The sensor of claim 3, wherein the thermopile includes a central absorber region.

5. The sensor of claim 4, wherein each thermocouple includes a hot junction positioned on the central absorber region.

6. The sensor of claim 4, wherein each thermocouple includes a cold junction positioned on the rim of the support chip.

7. The sensor of claim 3, wherein each thermocouple is made of bismuth and antimony.

8. The sensor of claim 3, wherein each thermocouple is made of chromel and alumel.

9. The sensor of claim 3, wherein each thermocouple is made of at least constantan.

10. The sensor of claim 3, wherein each thermocouple is made of at least P-type silicon semiconductor material.

11. The sensor of claim 1, wherein the support chip includes a cap and the cap and the outer rim are made from a first wafer, the thermopile being made of materials deposited on the first wafer, and the mating chip being made from a second wafer.

12. The sensor of claim 1, further comprising a window layer, the window layer being mated to a first side of the support chip and the mating chip being mated to a second side of the support chip, wherein the outer rim of the support chip is made from a first wafer, the mating chip is made from a second wafer, the window layer is made from a third wafer, and the thermopile is made of materials deposited on the first wafer.

13. The sensor of claim 1, wherein the support chip and the mating chip are made from silicon.

14. The sensor of claim 1, wherein radiant energy is able to penetrate the window region of the mating chip and impinge upon an absorber region of the thermopile, the radiant energy having a wavelength ranging from about 1 μm to about 14 μm.

15. The sensor of claim 1, wherein the thermopile includes at least two leads, each lead being connected to a respective terminal positioned on an exterior surface of the sensor.

16. The sensor of claim 15, wherein each terminal is positioned in a respective etch pit.

17. The sensor of claim 15, wherein the terminals are positioned in a common etch pit and lie in a plane defined by the thermopile.

18. The sensor of claim 15, further including a reference terminal positioned on the exterior surface of the sensor.

19. A method of fabricating a sensor for detecting radiant energy, comprising:
forming a support chip with an outer rim and a thermopile;
forming a mating chip with a rim region and a widow region; and
mating the support chip and the mating chip together.

20. The method of claim 19, wherein the support chip and the mating chip define an inner cavity in which the thermopile resides.

21. The method of claim 19, wherein forming the support chip includes forming a cap of the support chip and the outer rim from a first wafer, and depositing materials of the thermopile on the first wafer, and forming the mating chip includes forming the mating chip from a second wafer.

22. The method of claim 21, wherein the first wafer and the second wafer are made from silicon.

23. The method of claim 19, further comprising forming a window layer from a first wafer, wherein forming the support chip includes forming the outer rim from a second wafer and depositing materials of the thermopile on the second wafer, forming the mating chip includes forming the mating chip from a third wafer, and mating the support chip and the mating chip includes mating the mating chip to a first side of the support chip and mating the window layer to a second side of the support chip.

24. The method of claim 23, wherein the second wafer and the third wafer are made from silicon.

25. The method of claim 19, further comprising providing the thermopile with slots.

26. The method claim 25, further comprising supplying etching material through the slots to etch a cavity between the thermopile and the cap of the support chip.

27. The method of claim 19, wherein mating the support chip and the mating chip together includes bonding the support chip with the mating chip with a gold/tin alloy.

28. The method of claim 19, wherein mating the support chip and the mating chip together includes using gold-gold diffusion bonding.

29. The method of claim 19, wherein mating the support chip and the mating chip together includes using anodic bonding of silicon to a deposited layer of borosilicate glass.

30. The method of claim 19, wherein mating the support chip and the mating chip together includes bonding with solderglass frit.